REMARKS

The Applicant and the undersigned thank Examiner Bayard for a careful review of this application. Consideration of the present application is respectfully requested in view of the following remarks, which are responsive to the Official Action mailed August 18, 2004.

Claims 1-24 are pending in the present application. The independent claims are 1, 7, and 17. Applicant has amended Claims 1-7, 17, and 19-21. No new matter has been added.

I.   Independent Claims 1, 7, and 17 are patentable over the cited reference

The Examiner rejected independent Claims 1, 7, and 17 based on the assertion that these claims are anticipated by U.S. Patent No. 6,169,764 to Babanezhad. Applicant offers the following remarks to traverse the pending rejections.

A.   Claim 1 is distinguishable from *Babanezhad*

Claim 1, as amended, is an independent claim defining a method for signal processing that reduces the level of distortion of a received signal. Applicant respectfully submits that amended Claim 1 is not anticipated nor rendered obvious by *Babanezhad* because this claim recites features that are neither taught nor suggested by *Babanezhad*.

As amended, Claim 1 requires detecting signal energies in two frequency bands in each of a filtered signal and a quantized signal. *Babanezhad* does not disclose detecting signal energies in two frequency bands of a signal as recited in Claim 1. In contrast to two frequency bands, *Babanezhad* teaches obtaining a single, high-frequency band of a filtered signal and a single, high-frequency band of a quantized signal. See *Babanezhad* Figure 1, the high pass filters 106 and 108 and column 2, lines 50-56.

Also in contrast to detecting signal energies in two frequency bands in each of a filtered signal and a quantized signal as recited by Claim 1, *Babanezhad* discloses a differential equalization circuit in which a high-pass filter 106 obtains a single frequency band from a filtered signal and another high-pass filter 108 obtains a single frequency band from a quantized signal. As shown in Figure 2 of *Babanezhad*, each of these high-pass filters 106, 108 outputs a respective single frequency band as a differential signal, between A- and A+ for the filtered

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signal and between B- and B+ for the quantized signal, to servo control 304. The input at A- to servo control 304 is the voltage complement of the servo control input at A+. There is no teaching or suggestion in *Babanezhad* of having a different frequency band for each of input A+ and input A- in accordance with the recitations of Claim 1. Similarly, for complementary inputs B- and B+ *Babanezhad* does not disclose or teach different frequency bands. See *Babanezhad* Figure 2, and column 3, lines 17-24.

Amended Claim 1 further requires adjusting a filter parameter based on: a) the detected signal energies in a first frequency band of the filtered signal and the quantized signal; and b) the detected energy in a second frequency band of either the filtered signal or the quantized signal. *Babanezhad* does not disclose adjusting a filter parameter based on a first frequency band of a filtered signal and a quantized signal and a second frequency band of the filtered signal or of the quantized signal as recited in Claim 1. In contrast to the recitations of the adjusting step of Claim 1, *Babanezhad* discloses and teaches a single-frequency-band approach to adjusting an equalizing filter, whereby a single, high-frequency frequency band of the filtered signal and a single, high-frequency frequency band of the quantized signal provide the basis for filter parameter adjustment. See *Babanezhad* Figure 1 and column 2, lines 46-53 and 63-67.

In view of the foregoing, Applicant respectfully submits that *Babanezhad* fails to disclose or suggest detecting signal energies in two frequency bands in each of a filtered signal and a quantized signal as required by Claim 1. Applicant requests that the Examiner withdraw the rejection of Claim 1 and all claims dependent thereon.

B.   Claim 7 is distinguishable from *Babanezhad*

Claim 7, as amended, is an independent claim of a method for processing a communication signal having a data rate. Applicant respectfully submits that amended Claim 7 is not anticipated nor rendered obvious by *Babanezhad* because this claim recites features that are not disclosed or suggested by *Babanezhad*.

As amended, Claim 7 requires a step of monitoring a parameter, having a frequency greater than one half of the data rate, in the equalized communication signal and the communication signal and another step of monitoring low-frequency energy in the equalized

communication signal or the quantized communication signal. _Babanezhad_ does not disclose or teach monitoring low-frequency energy in an equalized communication signal or a quantized communication signal as recited by Claim 7. _Babanezhad's_ teaching and disclosure contrasts with monitoring low-frequency energy. As discussed above in reference to Claim 1, _Babanezhad_ teaches monitoring a single high-frequency band of an equalized communication signal and a single high-frequency band of a quantized communication signal.

Claim 7 also recites a step of comparing the parameter of the equalized communication signal to the parameter of the quantized communication signal and compensating the comparison according to monitored low-frequency energy in the equalized communication signal or the quantized communication signal. _Babanezhad_ does not disclose a step of compensating a comparison between monitored parameters according to low-frequency energy as recited by Claim 7. In contrast to compensating a comparison of parameters based on monitored low-frequency energy, _Babanezhad_ teaches subtracting a high-frequency band of an equalized communication signal from a high-frequency band of a quantized communication signal using a summing circuit 114 and integrating the result with a capacitor C. See _Babanezhad_ Figure 1 and column 2, lines 50-67.

In view of the foregoing, Applicant submits that _Babanezhad_ fails to disclose or suggest monitoring low-frequency energy in an equalized communication signal or a quantized communication signal as required by Claim 7. Thus, Applicant respectfully requests that the Examiner withdraw the rejection of Claim 7 and all claims dependent thereon.

C. Claim 17 is distinguishable from _Babanezhad_

Claim 17, as amended, is an independent claim for a signal processing circuit. Applicant respectfully submits that amended Claim 17 is not anticipated nor rendered obvious by _Babanezhad_ because this claim recites features that are not disclosed or suggested by _Babanezhad._

Amended Claim 17 recites a control circuit that adjusts a filter based on four signals, the first and third signals obtained at the filter output and the second and fourth signals obtained at the comparator output. The first, second, third, and fourth signals respectively comprise

components of the communication signal in a first, second, third, and fourth frequency range, wherein the third frequency range is below the first frequency range and the fourth frequency range is below the second frequency range. *Babanezhad does not disclose or teach adjusting a filter based on two frequency ranges* of a communication signal sampled at a comparator output or based on two frequency ranges of a communication signal sampled at a filter output in accordance with the requirements of Claim 17.

As discussed above in Applicant's remarks regarding Claim 1, the teachings of *Babanezhad's* contrast with adjusting a filter based two frequency ranges. *Babanezhad's* contrasting teachings include adjusting a filter based on a single, high-frequency range of a filter output and a single, high-frequency range of a comparator output. See *Babanezhad* Figure 1 and column 2, lines 46-56.

While *Babanezhad* may disclose a servo control 304 for equalizing filter 100 with four input ports labeled A-, A+, B-, and B+, *Babanezhad* does not disclose or teach using these ports for four signals having frequency ranges according to the recitations of Claim 17. In contrast to the invention of Claim 17, *Babanezhad* discloses coupling input ports A- and A+ to a single differential output of the filter 100 and coupling input ports B- and B+ to a single differential output of the comparator 102, wherein in each of these differential outputs undergoes high-pass filtering by one of the RC circuits 106, 108. See *Babanezhad* Figure 2 and column 3, lines 17-24.

In view of the foregoing, Applicant submits that *Babanezhad* fails to disclose or suggest adjusting a filter based two frequency ranges as required by the invention of Claim 17. Thus, Applicant respectfully requests that the Examiner withdraw the rejection of Claim 17 and all claims dependent thereon.

II.   Dependent Claims 2-6, 8-16, and 18-24 are patentable over the cited reference

Claims 2-6, 8-16, and 18-24 depend respectively from Claims 1, 7, and 17 and, therefore, incorporate the respective limitations of these independent claims. In view of the above-described distinctions between the reference cited by the Examiner and Claims 1, 7, and 17, Applicant respectfully submits that dependent Claims 2-6, 8-16, and 18-24 are patentable over

Babanezhad. Additionally, Claims 2-6, 8-16, and 18-24 recite features further distinguishing the inventions of each of these claims from *Babanezhad.*

The Examiner asserts that *Babanezhad* anticipates Claims 2-6, 8-13, 16, 18, and 20-24 based on the allegation that *Babanezhad* "inherently" discloses the recited elements of these dependent claims. However, the Examiner has failed to present *prima facie* evidence in the form of a specific citation to a portion of *Babanezhad* in support of the inherency position. Moreover, Applicant respectfully notes that the Examiner has not presented evidentiary support, such as a citation to a relevant prior art reference, in support of his position that the recitations of Claims 2-6, 8-13, 16, 18, and 20-24 are inherent within the disclosure of *Babanezhad.* Applicant respectfully traverses the Examiner's position and submits that each of Claims 2-6, 8-13, 16, 18, and 20-24 is distinguished from *Babanezhad* because *Babanezhad* does not inherently or otherwise disclose each and every recited feature in any of these claims.

A.   Dependent Claims 2-4 include recitations undisclosed by *Babanezhad*

Claims 2-4, as amended, depend from independent Claim 1 and include recitations related to the first and second frequency bands. The invention of amended Claim 2 requires the first frequency band to be above a threshold and the second frequency threshold to be below the threshold. Amended Claim 3 requires the first frequency band to comprise frequencies greater than one half the data rate and the second frequency band to comprise frequencies less than one half of the data rate. The invention of amended Claim 4 requires a step of detecting the signal energies in a first and a second component of each of the filtered signal and the quantized signal, wherein the first and second components respectively have frequencies less than the data rate and greater than one half of the data rate.

As discussed above with reference to Claim 1, *Babanezhad* neither discloses nor teaches signal processing using two frequency bands as required by Claim 1 and the claims that depend thereon. In contrast to teaching two frequency bands, *Babanezhad* discloses an equalizer circuit with two filters 106, 108, both of which are high-pass filters 106, 108. See *Babanezhad* Figure 1.

Babanezhad does <u>not</u> disclose a frequency band that is above a threshold and another frequency band that is below a threshold in accordance with dependent Claim 2. *Babanezhad* also does not disclose a frequency band that is greater than one half of the data rate and another band that is less than one half of the data rate in accordance with dependent Claim 3. Further, *Babanezhad* does not disclose detecting signal energies in two signal components, one having a frequency less than the data rate and the other having a frequency greater than one half of the data rate in accordance with dependent Claim 4. In contrast to the requirements of the inventions of amended Claims 2-4, *Babanezhad* teaches controlling an equalizer filter 100 based on the difference between the edges of the signals at the input and outputs of the comparator 102 by passing a portion of each of these signals through a <u>high-pass</u> filter 106, 108. See *Babanezhad* column 2, lines 46-56 and Figure 1.

In view of the foregoing, Applicant submits that *Babanezhad* fails to disclose or suggest detecting energy in a frequency band that is below a frequency threshold or less than one half of the data rate as respectively required by Claims 2 and 3. Applicant further submits that *Babanezhad* neither discloses nor suggests detecting energy in a component, having a frequency less than the data rate, of a filtered signal and of a quantized signal as required by Claim 4. Applicant respectfully requests that the Examiner withdraw the rejection of Claims 2-4.

B.   Dependent Claims 5, 6, and 9 include recitations undisclosed by *Babanezhad*

Amended Claims 5 and 6 depend from independent Claim 1, while Claim 9 depends from independent Claim 7. As amended, Claims 5 and 6 each recite a step of scaling the signal energy of the filtered signal based on the signal energy of the quantized signal and another step of scaling the signal energy of the quantized signal based on the signal energy of the filtered signal. Claim 9 recites a step of scaling the parameter in the equalized communication signal based on low-frequency energy in the quantized communication signal and another step of scaling a parameter in the quantized communication signal based on low-frequency energy in the equalized communication signal.

Babanezhad does <u>not</u> disclose scaling parameters or energies of quantized or filtered signals in accordance with the respective recitations of Claims 5, 6, and 9. In contrast to scaling

parameters or energies of equalized and quantized signals, *Babanezhad* teaches filtering and squaring an equalized signal and a quantized signal, generating a difference between these filtered-and-squared results, and integrating the difference. See *Babanezhad* Figure 1 and column 2, lines 63-67.

Applicant respectfully requests that the Examiner withdraw the rejections of Claims 5, 6, and 9 in view of *Babanezhad's* failure to disclose or suggest scaling parameters or energies of filtered or quantized signals according to the respective recitations of these claims.

C.   Dependent Claim 8 includes recitations undisclosed by *Babanezhad*

Claim 8 depends from independent Claim 7 and recites a step of determining a difference between the low-frequency energies in the equalized and the quantized communication signals. In addition to not disclosing monitoring low-frequency energy as discussed above, *Babanezhad* does not teach, disclose, or suggest determining a difference between low-frequency energies in the equalized and the quantized communication signals. In contrast to the recitations of Claim 8, *Babanezhad* teaches comparing high-frequency components of the equalized and the quantized communication signals. See *Babanezhad* Figure 1 and column 2, lines 46-50 and lines 63-65.

In view of the foregoing, Applicant respectfully requests that the Examiner withdraw the pending rejection of Claim 8.

D.   Dependent Claims 16 and 22 include recitations undisclosed by *Babanezhad*

Claims 16 and 22 depend respectively from independent Claims 7 and 17 and each recites a Bode equalizer. *Babanezhad* does not disclose and does not suggest a Bode equalizer. In contrast to a Bode equalizer, *Babanezhad* discloses one equalizing filter 100 that employs transconductance-capacitor techniques and another equalizing filter 400 implemented using differentiators that are made up of a variable resistor (R) along with an operational amplifier (opamp) and its differentiating capacitor (C). See *Babanezhad* Figures 1 and 3 and column 3, lines 33-36 and lines 44-50. In view of *Babanezhad's* failure to disclose or suggest a Bode equalizer as discussed above, Applicant respectfully requests the Examiner to withdraw the rejections of Claims 16 and 22.
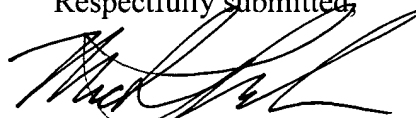
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E.   Dependent Claim 20 includes recitations undisclosed by Babanezhad

Claim 20, as amended, depends from independent Claim 17 and recites a control circuit comprising two high-pass filters and two low-pass filters. *Babanezhad* does not disclose or suggest a control circuit having two high-pass filters and two low-pass filters as required by the invention of Claim 17. In contrast to disclosing a control circuit with two high-pass filters and two low-pass filters, *Babanezhad* teaches a control circuit having two high-pass filters 106, 108. See *Babanezhad*, Figures 1, 2, and 4. In view of *Babanezhad's* failure to disclose or suggest a control circuit having two high-pass filters and two low-pass filters, Applicant respectfully requests that the Examiner withdraw the rejection of Claim 20.

CONCLUSION

The foregoing is submitted as a full and complete response to the Official Action mailed August 18, 2004. Applicants thank Examiner Bayard for his consideration of the amendments and remarks presented by this paper. Applicants have shown that the pending claims are allowable and allowance of the claims is respectfully requested. It is believed that this response places the application in condition for allowance. Such action is courteously requested. If there are any issues that can be resolved with an Examiner's Amendment or a telephone conference, a telephone call to the undersigned at 404.572.3486 is respectfully requested.

Respectfully submitted,

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